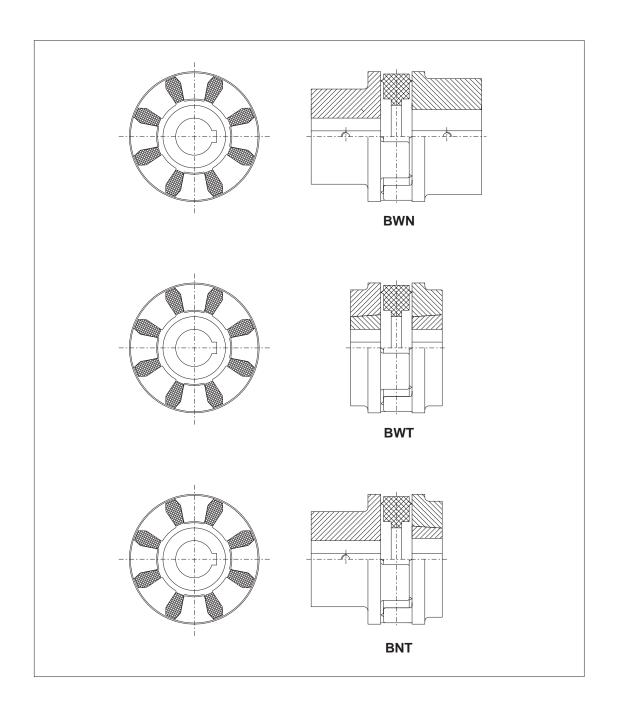
Operating Instructions

BA 3400 EN 11.95

Flexible **BIPEX** couplings types **BWN**, **BWT** and **BNT**



FLENDER

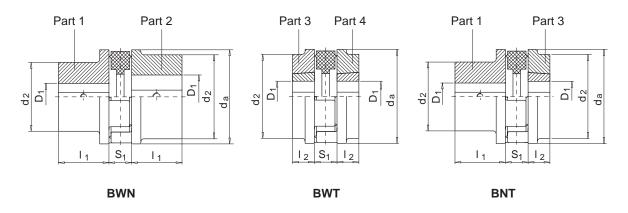
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1. Technical data

1.1 General technical data



	Nominal torque	Spe n _m			Bo D				d Pa					S ₁	TAPER bush	We Pa	ight art
Size	T _{KN}	Cam	ring	Part		Part		da	1/2	3/4	I ₁	l ₂		Devia- tion	No.	1/2	3/4
	1)	92 Sho	80 ore	from	to	from	to 2)									3)	3)
	Nm	1/n	nin	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		kg	kg
43	13.5	5000	5000	-	25			43	43		22		12	+0.5		0.14	
53	24	5000	5000	-	30			53	50		25		14	+0.5		0.24	
62	42	5000	5000	_	35	10	25	62	58	58	30	23	16	+0.5	1008	0.36	
72	75	5000	4800	_	32 42	10	28	72	54 68	68	35	23	18	+0.5	1108	0.6 0.72	0.65
84	130	5000	4100	_	38 48	11	32	84	64 76	76	40	26	21	+0.5	1210	0.89 1.1	0.9
97	220	5000	3500	-	42 50			97	72 85		50		24	+1		1.4 1.7	
112	360	5000	3100	-	48 60	14	42	112	82 100	100	60	26	27	+1	1610	2.1 2.7	2.05
127	550	5000	2700	-	55 65			127	94 110		65		27	+1		3.1 3.7	
142	800	4900	2500	_	60 75	18	50	142	100 126	126	75	33	31	+1	2012	4.2 5.3	4
162	1250	4200	2100	_	65 80			162	110 134		80		36	+1		6.0 7.2	
182	1750	3800	1900	_	75 90	18	60	182	126 152	152	90	45	42	+1	2517	8.6 10.5	7.75
202	2650	3400	1700	_	80 100	35	75	202	134 168	168	100	52	48	+1	3020	11.5 14	10.5
227	3700	3000	1500	_	90 110	42	90	227	150 180	180	110	90	54	+2	3535	18 21	17.5

Table 1.1: Torques $T_{\mbox{\scriptsize KN}_{\mbox{\tiny }}}$ speeds $n_{\mbox{\scriptsize max.}}$ and dimensions

- 1) For types BWT and BNT, the slipping moment T_R in Section 6., item 6.7 should be observed in addition when using a TAPER bush without a parallel key. Principally, the smaller value is decisive for checking the design.
- 2) Bores are partially designed with flat keyway, see Section 6., item 6.1.1.1.
- 3) Weights are valid for max. bores including portion of the cam ring.



The nominal torques T_{KN} are valid for:

- · daily operating cycle up to 24 h
- during the starting process or during operation, torque impulses up to the triple nominal torque are allowed up to 25 times per hour.
- · Operation within the prescribed alignment
- Operation in the temperature range from 30 °C to + 80 °C (ambient temperature or temperature of the shaft ends).

Caution!

For permanent trouble-free operation, the coupling has to be designed with a service factor appropriate to the respective application. When changing the operating conditions (performance, speed, changes on power engine and machine), a check of the design is absolutely necessary.

2. General notes

2.1 General

These Operating Instructions constitute part of the coupling shipment and should be kept in the immediate vicinity of the coupling at all times.

Only a precise knowledge of the Operating Instructions will ensure trouble-free operation of the coupling. It is therefore in the interest of our customer that the operating instructions are read, understood and observed in all respects by the persons responsible for handling, installation and operation.

Note:

We accept no liability for any damage or malfunction resulting from non-observance of the operating instructions.

The "**coupling**" dealt with in these operating instructions was developed for stationary use in general engineering.

The coupling is only designed for the field of application as specified in Section 1 "Technical data". Operating conditions which differ from the stated will require fresh contractual agreements.

The coupling described here is in accordance with the state of the art at the time of these operating instructions go into print.

In the interest of further development, we reserve the right to introduce modifications which, while retaining the essential features, can be regarded as desirable to increase its efficiency and safety.

The copyright of these Operating Instructions remains the property of **FLENDER AG**.

These operating instructions may not be duplicated in part or whole, utilized for the purpose of publicity or communicated to third parties without our expressed consent.

Please contact our works listed below in respect of all technical queries.

FLENDER AG D 46393 Bocholt

Telephone: 02871/92-2800 Telefax: 02871/92-2801

or one of our service branches which are listed in Section 11 "Stocking spare parts, service facility addresses".



3. Safety notes

3.1 Safety notes

- The coupling is constructed in accordance with the state of the art and is reliable in the condition as shipped. Unauthorized modifications which impair its reliability are not permissible. This also applies to guards which are fitted as protection against accidental contact.
- The coupling may only be used and operated within the scope of the condition specified in the contract of performance and supply.
- The customer should ensure that the persons entrusted with installation, operation, care and maintenance as well as repair have read and understood the operating instructions and observe them in all respects in order to:
 - prevent hazard to life and limb of the user and third parties
 - ensure the reliability of the coupling

and

- prevent failure and environmental pollution due to incorrect handling.
- The relevant regulations concerning industrial safety and pollution control should be observed during handling, installation, operation as well as care and maintenance.
- The coupling may only be operated, serviced and repaired by authorized, trained and properly instructed personnel.
- All work should be carried out with care with the safety aspect in mind.
- All work on the coupling may only be carried out when it is stationary.
 The coupling must be secured to prevent accidental start up (e.g. by locking the key switch or by removing the fuses and the power supply). A notice should be displayed at the switch-on point stating that work is in progress on the coupling.
- The drive unit should be shut off at once if changes in the coupling are detected during operation, such as e.g. changed running noises.
- The coupling must be protected by means of suitable guards to prevent accidental contact.
- During installation of the coupling in units or systems, the manufacturer of the units or systems is obliged to incorporate the requirements, notes and descriptions contained in these operating instructions in his own operating instructions.
- 3.1.1 Notes and symbols in the operating instructions

Instructions in the operating instructions which concern operating safety are emphasized as follows:



This symbol draws attention tosafety measures which must be observed to prevent **personal injury**.

Caution!

This symbol draws attention to safety measures which must be observed to prevent damage to the coupling.

Note:

This note draws attention to general **operating notes** which should be especially observed.

4. Handling and storage

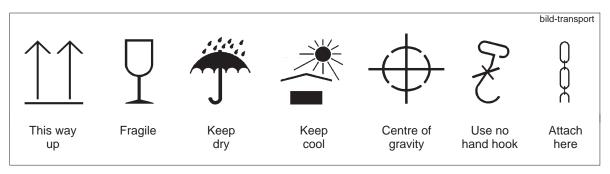
4.1 Scope of supply

The scope of the shipment is listed in the shipping documents. They should be checked for completeness on receipt. Any shipping damage and/or missing parts should be reported in writing at once. After consulting FLENDER an expert is to be called in.

4.2 Handling

The packing of the coupling will differ depending on method of shipment and size. The packing, unless otherwise agreed contractually, complies with **HPE Packing Guidelines**.

The symbols shown on the packing should be noted. Their meaning is as follows:



Caution!

Make sure that suitable hoists are used.

4.3 Storage

4.3.1 Storage of the coupling parts

The coupling is delivered in a preserved state and can be stored at a covered dry place up to 6 months. If the coupling shall be stored for a longer period of time, an appropriate long-term preservation is necessary (consultation with FLENDER required).

Caution!

Before cleaning the coupling parts and applying the long-term preservation, the cam ring is to be removed.

4.3.2 Storage of the cam rings

4.3.2.1 General

Properly stored cam rings keep their characteristics for up to five years. Unfavourable storage conditions and improper treatment of the cam rings result in a negative change of their physical characteristics. These changes can be caused by the effects of e.g. oxygen, ozone, extreme temperatures, light, moisture or solvents.

4.3.2.2 Storage room

The storage room should be dry and dust-free. The cam rings must not be stored together with chemicals, solvents, fuels, acids, etc.. Furthermore, they should be protected against light, especially against direct sunlight and strong artificial light with a highultra- violet percentage.

Caution!

The storage romms must not contain any ozone-producing devices like e.g. fluorescent light sources, mercury-vapour lamps, electric high-voltage devices. Damp storage rooms are unsuitable. Make sure that no condensation develops. The relative humidity of air is most favourable below 65 %.

5. Technical description

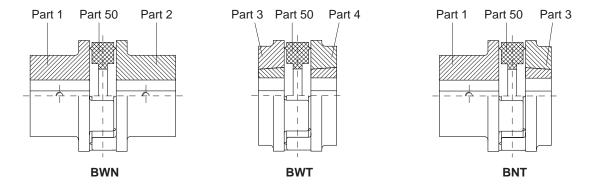
5.1 General description

The BIPEX coupling - 3 types are available - consists of two coupling parts and one cam ring.

The cam ring from polyurethane can be supplied in the standard hardness 92 Shore as well as in the soft design 80 Shore.

When using this cam ring, keep in mind the reduction of the speeds (see Section 1. "Technical data").

The BIPEX coupling is suitable for reversing operation.



Type BWN consists of two coupling parts with cylindrical bores.

Type BWT consists of two coupling parts with TAPER bush.

The difference between coupling parts 3 and 4 is the location of the assembly side of the TAPER bush. For coupling part 3, the assembly side is located on the inside, for coupling part 4, it is located on the outside.

Type BNT is a comibnation of types BWN and BWT.

It consists of a coupling part with cylindrical bore and a coupling part with TAPER bush.

Any combination of the parts is possible.

5.2 Principle of the TAPER bush

Hubs are installed on shafts in a shrink-fit way by means of TAPER bushes.

A hexagon head wrench with torque adjustment is required for the assembly. The same grub screws are used for clamping and releasing.

TAPER bushes are cylindrical on the inside, tapered on the outside and have a slot on the whole length.

All TAPER bushes are provided with parallel keyway.

6. Assembly

6.1 Notes on fitting the finished bore, the axial securing, the set screws, the balancing

6.1.1 Finished bore

- Remove cam ring from part 1/2.
- Clean coupling part 1/2.



Observe manufacturer's instructions on handling solvents.



When fitting the finished bore, align the parts carefully. For the permissible radial and axial excentricity see DIN ISO 286 degree of fundamental tolerance IT8. The location of the parts (Γ) is to be carried out on the marked surfaces.

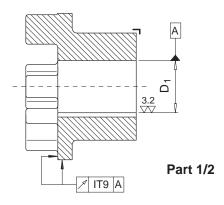
Caution!

The maximum permissible boring diameters (see Section 1.) are designed for driving connections without tightening according to DIN 6885/1 and must not be exceeded in any case.

If other shaft hub connections (e.g. splined hub profile, tapered or graded bore, driving connection with tightening, etc.) shall be fitted instead of the intended driving connections, FLENDER is to be consulted.



Non-observance of these notes may lead to the drifting of coupling. There is a danger to life due to broken pieces flying around!



The coupling parts 3 and 4 are supplied with bore for TAPER bush.

In case of drive by means of parallel keys, the following fit pairings are prescripted for the bores:

h6	h8	k6	m6	n6	Boring Tolerances			
	Diameter in mm							
			> 25		H7			
		≤ 50			H7			
				> 100	H7			
≤ 50					K7			
> 50					M7			
	all				N7			

Table 6.1: Fit pairings

Caution!

Observing the fit correspondance is absolutely necessary, on the one hand in order to keep low the backlash in the shaft hub connection or, on the other hand, to keep the hub tension caused by the overdimension within the permissible load depending on the use of the tolerance fields. It cannot be excluded, that the shaft hub connection is endangered when the fit correspondance is not observed.



Non-observance of these notes may lead to the bursting of the coupling. There is a danger to life due to broken pieces flying around!

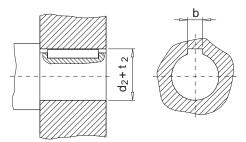
6.1.1.1 Keyway

The keyways have to be designed according to the existing parallel keys. For keyways, the tolerance field of the hub keyway width **ISO JS 9** is to be observed.

For more difficult operating conditions, as it is the case for e.g. reversing operation of operation with impulses, the tolerance filed of the hub keyway width **ISO P9** is prescribed.

Note:

In case of some TAPER bushes, the parallel keyway is designed as flat keyway dependent on the bore (see table 6.2).



Drive type fastening without tension

TAPER bush	Bore	Width	Hub keyway depth	TAPER bush	Bore	Width	Hub keyway depth
No.	d ₂	b	d ₂ + t ₂	No.	d_2	b	d ₂ + t ₂
		JS9				JS9	
	mm	mm	mm		mm	mm	mm
1008	24	8	d ₂ +2	1108	28	8	d ₂ +2
1008	25	8	d ₂ + 1.3	1610	42	12	d ₂ + 2.2

Table 6.2: Flat keyway in TAPER bushes

6.1.2 Axial securing

For axially securing the coupling parts 1 and 2, a set screw or an end plate has to be provided for. When using end plates, FLENDER is to be consulted with regard to the insertion of recess in the coupling parts.

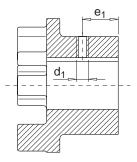
6.1.3 Set screws

Headless pins with notched cut point according to DIN 916 are to be used as set screws.

It is absolutely necessary to observe the following guidelines!



The length of the set screw is to be chosen so that it completely fills the cut hole but that it does not protect over the hub $(L_{min} = d_1 \times 1.2)$.



Part 1/2

Bore range	> 6 - 30	> 30 - 38	> 38 - 65	> 65 - 95	> 95 - 110
Set screw size d ₁	M6	M8	M10	M12	M16

Size	43	53	62	72	84	97	112	127	142	162	182	202	227
Distance dimension e ₁	10	12	14	17.5	20	25	30	32.5	37.5	40	45	50	50

Table 6.3: Set screw assignment

Caution!

In case of coupling parts 1 and 2, the set screw should be arranged by 180° offset to the keyway up to size 84 inclusively. From size 84 on, the set screw is to be arranged on the parallel keyway.

Balancing 6.1.4

Prebored couplings resp. prebored coupling parts are shipped unbalanced. For these parts et is recommended to balance them depeding on the application case after finish boring (see also DIN 740, VDI guideline 2060).

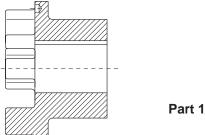
Balancing is usually carried out by material cutting through boring. In order ro restrict the material quantity to be cut to a minium, the biggest possible balancing radius is to be selected.

Caution!

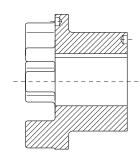
Cutting has to be carried out between the cams without through-boring of the bottom.

The coupling parts 3 and 4 of types BWT and BNT are already factory-balanced at one plane of quality grade Q16.

Finished bored couplings or coupling parts are balanced according to the instructions of the ording party.







Arrangement of the balancing bore in case of one level balancing

Arrangement of the balancing bore in case of two level balancing

6.2 General installation notes

For the installation the safety notes in Section 3. are to be observed.

The installation has to be carried out with utmost care by trained personnel.

Already during the planning phase it is to be observed that sufficient room is to be provided for the installation and later inspection and maintenance work.

Before starting the installation a sufficient number of hoists must be provided for.

6.3 Installing the coupling parts

Before starting the assembly, the shaft ends, the couplings parts as well as the TAPER bushes have to be cleaned thoroughly and degreased. Before cleaning the coupling parts with solvents, remove the cam ring.



Observe the manufactuer's instructions on handling the solvents.

6.3.1 Coupling parts 1 and 2

Caution!

The coupling parts are to be fitted by means of suitable devices in order to prevent damage to the shaft bearing arrangement by the axial fitting force. Make sure that suitable hoists are used.

The shaft ends must not project on the inside of the hub. Axial securing is done by means of the set screws or the end plate.

Caution!

Tightening of the set screws only by means of a hexgon socket head wrench according to DIN 911, without an extension pipe.



Non-observance of these notes may lead to the burrsting of the coupling. There is danger to life due to broken pieces flying around!



Warming up the coupling parts (to max. +150 °C) might make the fitting easier. In case of temperatures of above +80 °C, the cam ring has to be removed from the coupling parts before warming up.



Protect yourself against burns by hot parts!

After fitting the coupling parts, set in the cam ring if removed before. Coupling parts, which were warmed up before, have to be cooled down again to a temperature below 80 °C.

Loop together the machines to be coupled.



Danger of squeezing!

Observe the dimension S_1 (see Section 1.).

6.3.2 Coupling parts 3 and 4

The TAPER bushes have axially parallel, cylindrical and plane blind holes in the large end face up to size 3030=2 and from size 3535=3 on but only half of the hole is in the material of the bush. The other half, located in the hub, has threads.

Fit coupling part and TAPER bush, align the holes and slightly tighten the screws.

Place the coupling part with the TAPER bush on the shaft and tighten the screws (see item 6.7 for tightening torques).

When screwing, the hub is pulled on to the tapered bush and thus the bush is pressed onto the shaft. Taking into consideration the assignment of the bores to the slipping moments (see item 6.7), this type of fastening is sufficient for transmitting the specified nominal torques up to coupling size 84. From size 112 on, a parallel keyway connection should be provided for higher torques (see Section 1. and Section 6., item 6.7).

All TAPER bushes are provided with parallel keyways.

Loop together the machines to be coupled.



Danger of squeezing!

Observe the dimension S_1 (see Section 1.).

6.4 Disassembly of the TAPER bushes

The TAPER bushes are released by removing the screws. Then, one of the scres is screwed into the thread of the bush as forcing screw and is then tightened.

Two forcing screws are provided from TAPER bush No. 3535 on.

The coupling part released in this way can be pulled off by hand without tool together with the TAPER bush.

6.5 Aligning

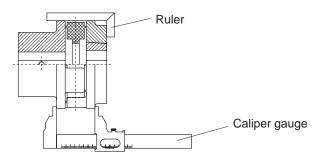
The couplings compensate for positional variations of the shaft ends to be connected up to the data shown under item 6.6.

When aligning, the radial and angular misalignment of the shaft ends should be kept as small as possible in order to prolong the life of the cam ring under and otherwise the same operating conditions.

The alignment should be realised in the order:

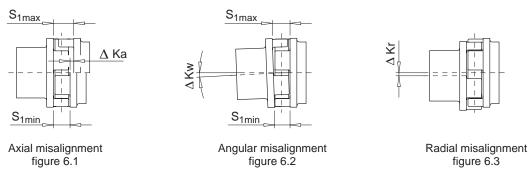
- 1. angular alignment
- 2. radial alignment

and should be carried out in two axial planes vertical to each other. This can be done by means of a caliper gauge (angular misalignment) and a ruler (radial misalignment) according to the figure. The distance dimension S₁ is to be kept (see Section 1.).



By using a dial gauge, the alignment precision can be increased.

6.6 Possible misalignments



Misalignments of the coupling parts may result from an inexact alignment during the assembly but also from the operation of the plant (expansion due to heat, bending of the shaft, machine frame to soft, etc.).

Caution!

The following max. permissible misalignments must not be exceeded during operation under any circumstances.

6.6.1 Axial misalignment

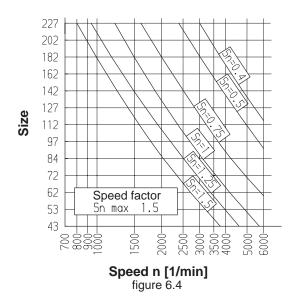
Axial misalignment ΔKa (figure 6.1) of the coupling parts to each other is permissible within the "permissible variation" for the dimension S_1 (see Section 1.) .

6.6.2 Angular misalignment

The permissible angular misalignment ΔKw (figure 6.2) has to be determined taking into consideration the speed factor Sn of figure 6.4. $\Delta Kw_{perm.}$ = 0.00175 \times da \times Sn da = Coupling size

6.6.3 Radial misalignment

The permissible radial misalignment ΔKr (figure 6.3) has to be determined taking into consideration the speed factor Sn of figure 6.4. $\Delta Kr_{perm.} = 0.00175 \times da \times Sn$ da = Coupling size



Caution!

Angular and radial misalignments may occur at the same time. The sum of both misalignments must not exceed the max. permissible value of the angular or radial misalignment.

 $(Kw + Kr)_{existing} \le \Delta Kw x Sn or \Delta Kr x Sn$

6.7 TAPER bush

	TAPER bush	Bush bore	Slipping mo- ments	Tightening torque		g screws	Screw driver
Size			1)		DIN	911	
	No.	D_1	T _R	TA	BSW	Length	S
		mm	Nm	Nm	Inch	Inch	mm
62	1008	12 19 24	29 51 66	5.6	1/4	1/2	3
72	1108	12 19 28	28 49 79	5.6	1/4	1/2	3
84	1210	16 24 32	82 142 210	20.0	3/8	5/8	5
112	1610	19 24 42	98 135 265	20.0	3/8	5/8	5
142	2012	24 42 50	165 340 420	31.0	7/16	7/8	5
182	2517	24 48 60	220 510 670	48.0	1/2	1	6
202	3020	38 55 75	520 890 1300	90.0	5/8	1 1/4	8
227	3535	42 75 90	1000 2150 2600	113.0	1/2	1 1/2	10

¹⁾ The specified slipping moments T_R are valid for the use of TAPER bushes without parallel key taking into consideration the specified tightening torques T_A. These slipping moments are valid for service factor f₁=1. Slipping moments of bores not listed in the table can be determined by interpolation. Prerequisite for achieving the specified slipping moment is always a clean and grease-free surface of the parts to be joined as well as thoroughly greasing of the tightening screws. If the value determined for T_R is larger than the nominal coupling torque T_{KN}, the smaller value (- i.e. T_{KN} -) is decisive for checking the design.

7. Start-up

7.1 Measures before startup

Before startup, check the tightening of the set screws, the alignment and the distance dimension S_1 and correct if necessary and check all screw connections for the prescribed tightening torques (see Section 1. and Section 6.). Finally, the coupling guard to prevent accidental contact is to be fixed.

8. Operation

8.1 General operating data

During operation, the coupling should be checked for:

- any changes in running noises
- sudden shaking.



Caution!

If irregularities are detected during operation, the drive assembly should be set off immediately. The cause of the malfunction should be determined with the aid of the Troubleshooting Table (Section 9.).

The Troubleshooting Table lists possible malfunctions, their causes and suggestions for remedying them.

If the cause cannot be determined or there is no facility for repair with suitable equipment, we recommend calling in one of our service fitters (see Section 11.).

9. Disturbances, reasons and remedy

9.1 General

The malfunctions listed below can only be hints for a troubleshooting.

In case of a complex plant, all other components have always to be included in the troubleshooting.

The coupling has to run with low noise and without shaking in all operating phases. Any deviating behaviour is to be regarded as malfunction and should be repaired immediately.



Before maintenance work, repairs or other work, the operator should make sure that the whole drive train is stationary. Especially the drive motors are to be secured against accidental start up.

Futhermore, we refer to the relevant regulations on the prevention of accidents at the place of installation.

9.2 Possible malfunctions

Malfunctions	Causes	Remedy
Sudden change of the noise level and/or sudden shaking	Change of alignment	Shut down the plant
lever and/or sudden snaking		possibly repair the reason for the change of alignment (e.g. fasten loose foundation bolts)
		Check for wear Procedure as described in Section 10.
	Cam ring worn	Shut down the plant
	Torque transmission by metal contact	Disassemble coupling and remove the rests of the cam ring
		Check coupling parts and exchange damaged coupling parts
		Install cam ring, join coupling parts
		Check alignment and correct if necessary, see Section 6.
		Tightening torques of the screw connection according to Section 6.



10. Maintenance and repair

10.1 Change of wear parts

Only use original **BIPEX** cam rings as spare cam rings in order to guarantee a perfect transmission of the torque and a trouble-free function.

Note: Changing the cam ring without moving the coupled machines is not possible.

Carefully observe the instructions of Section 6. "Installation" and Section 7. "Start up" for the re-installation.

11. Spare parts, service facitily addresses

Maintaining a stock of the most essential spare and wear parts is an important prerequisite for the permanent service ability of the coupling.

When ordering spare parts, the following data should be stated:

- Part No. (see Section 5.)
- Description / Size (the size designation corresponds to the outer diameter da in mm)
- Quantity

We assume warranty only for original spare parts supplied by us.

Caution!

We would expressly draw attention to the fact that spare parts and accessories not supplied by us have not been tested or approved by us either. Fitting and/or use of such products can therefore under certain circumstances adversely affect structurally specified properties of the coupling and will thus impair active and/or passive safety. No form of reliability or warranty will be assumed by FLENDER for damage occasioned by use of non-original spare parts and accessories.

Please note that production and supply specifications frequently exist for components and we will always offer spare parts in accordance with the state of the art and in accordance with the latest legal requirements.

11.1 Service facility addresses

When ordering spare parts or requesting a service fitter, please contact FLENDER AG first of all.

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12. Declaration by the manufacturer

Declaration by the manufacturer

in accordance with EC Engineering Guideline 98/37/EC, Appendix II B

We hereby declare that the

Flexible **BIPEX** couplings types **BWN**, **BWT** and **BNT**

described in these Operating Instructions are intended for incorporation in a machine, and that it is prohibited to put them into service before verifying that the machine into which they are incorporated complies with the EC Guidelines (original edition 98/37/EC including any subsequent amendments thereto).

This Manufacturer's Declaration takes into account all the unified standards (inasmuch as they apply to our products) published by the European Commission in the Official Journal of the European Community.

Bocholt, 1995-11-15

Signature (person responible for products)